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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
HERVE THELLIER, ET AL.	: EXAMINER: SZEWCZYK, C.
SERIAL NO: 10/550,736	:
FILED: SEPTEMBER 26, 2005	: GROUP ART UNIT: 1791
FOR: METHOD FOR CROWNING SHEETS OF GLASS BY PRESSING AND SUCTION	:

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313
SIR:

I. REAL PARTY IN INTEREST

The real party in interest is SAINT-GOBAIN GLASS, FRANCE.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-12 have been cancelled. Claims 13- 26 are being appealed.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The appealed claims recite a method of simultaneously bending two or more superposed glass sheets. According to independent Claim 13 the method includes the steps of:

allowing the glass sheets [3] to sag under gravity [Fig. 2B; p. 16, lines 7-15];

placing a central region of the superposed glass sheets [3] into contact with a male former [2] in a bending cell, said male former being surrounded by a passage between the male former and a surrounding skirt [16], by advancing a female former [4] supporting the superposed glass sheets toward the male former located above the female former, while continuously supporting the glass sheets with the female former [p. 16, lines 26-28];

pressing a peripheral region of the superposed glass sheets [3] between the male former [2] and the female former [4] to clamp together the edges of the glass sheets to seal the space between the sheets [Fig. 2C; p. 16, lines 16-20], wherein the glass sheets are continuously supported by the female former prior to the pressing step and until at least after the commencement of the pressing step [p. 16, lines 26-28];

applying a partial vacuum to an uppermost one of the superposed glass sheets [3] through the convex surface of the male former [4], which has means for applying a partial vacuum through the convex surface [means plus function limitation; corresponding structure shown in Fig. 6 and described at p. 19, lines 10-15], while continuing the pressing step, wherein application of the partial vacuum commences after the upper glass sheet has made contact with the male former [Fig. 2D; p. 16, lines 22-34];

discontinuing the pressing step by separating the male former [2] from the female former [4], the superposed glass sheets [3] remaining in contact with the male former under an effect of a partial vacuum at least partly applied through the passage between the male former and the skirt surrounding the male former [p. 16, lines 28-34];

while the superposed glass sheets are in contact with the male former under the effect of the partial vacuum, bringing a cooling support under the glass sheets [sentence bridging pp. 16-17];

stopping the partial vacuum to allow the superposed glass sheets to rest on the cooling support [p. 17, lines 3-6]; and

taking the superposed glass sheets away for cooling the glass outside the bending cell [p. 17, lines 3-6].

Independent Claim 23 corresponds to Claim 13 except that it recites that the convex surface of the male former is at least partly air permeable, rather than means for applying a partial vacuum through the convex surface. Basis for this is element 15, which is described at page 19, lines 14-15.

In each case, in a process for forming bent glass sheets, two or more superposed glass sheets which have been allowed to sag under gravity are advanced on a female former to a male former surrounded by a passage between the male former and a surrounding skirt. The glass sheets are pressed at their peripheral region between the female former and the male former while a partial vacuum is applied through the male former, wherein the glass sheets are continuously supported by the female former prior to the pressing step and the application of the partial vacuum commences after the upper glass sheet has made contact with the male former.

Since plural superposed sheets are to be pressed, it is important that their relative positions do not shift prior to pressing. This is assured, according to the invention, by

continuously supporting the sheets by the female former prior to the pressing step and until at least after the commencement of the pressing step, and by commencing application of the partial vacuum after the upper glass sheet has made contact with the male former. It is also assured by pressing a peripheral region of the superposed glass sheets between the male former and the female former to clamp together the edges of the glass sheets to seal the space between the sheets.

Pressing the periphery of the superposed glass sheets clamps together their edges, to seal the space between the sheets at the periphery. As a consequence, a peripheral seal is formed between the sheet directly in contact with the male former, and also between the individual glass sheets. The force of the partial vacuum applied to the sheet placed against the male former is thereby communicated to the lower sheets through the passage between the male former and the skirt, whereby all of the glass sheets are equally pressed onto the male former. As a result, the lower sheets do not separated from the upper sheet, and all the glass sheets have exactly the same shape, which is very close to the intended shape. See. p. 6, lines 3-27.

Dependent Claims 15 and 24 further recites that, during the step of applying the partial vacuum through the male former, positive gas pressure is also applied through the male former in a central region of the glass sheets [p. 19, lines 7-14], the male former being covered with a fibrous material [15; p. 19, lines 14-15].

VI. <u>GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL</u>

Claims 13-18 stand rejected under 35 U.S.C. § 103 as being obvious over U.S. patent 5,292,356 (<u>Herrington et al</u>) in view of U.S. patent 5,713,976 (<u>Kuster et al</u>).

Claims 19 and 22 stand rejected under 35 U.S.C. § 103 as being obvious over <u>Herrington et al</u> in view of <u>Kuster et al</u> and U.S. patent 6,138,477 (<u>Morin</u>).

VII. ARGUMENT

A. Herrington et al in view of Kuster et al

Herrington provides upper and lower press members 29 and 30 between which a single glass sheet S is pressed to bend the glass sheet. In particular, the upper mold member 29 can provide a negative air pressure to assist in the shaping of the glass sheet being carried by the ring shaped lower press member 30. The negative air pressure also assists in the *handling* of the glass sheet (col. 7, lines 23-25), which indicates that it is initiated before the glass sheet has contacted the upper mold member. That is, the description that the negative air pressure also assists in the handling of the glass sheet suggests that it is used to raise the glass sheet into contact with the upper mold member. In any case, there is no description in Herrington that the negative air pressure commences after the glass sheet has made contact with the upper mold member.

Additionally, Herrington is only directed to the bending of a single glass sheet, e.g., for a satellite dish (col. 1, line 29), or a single layer of a laminated automobile windshield (col. 1, lines 38-39), and not a method of simultaneously bending two or more superposed glass sheets. The "Summary of the Invention" in Herrington thus only refers to bending a "sheet." See col. 3, lines 38, 52 and 58. Similarly, only a single sheet 10 is shown in the figures, and only a singular "sheet" S is referred to in the example (e.g., col. 7, line 28).

Since Herrington only bends individual sheets of glass, it is not concerned with the problem that the invention addresses: assuring that the relative positions of superposed sheets remain unchanged. partial vacuum from the upper press member is communicated to a lower sheet of superposed glass sheets. Nor does it teach the claimed solution to this problem: applying the vacuum after the upper glass sheet supported by the lower female former has made contact with the male former, and thereafter applying a vacuum through a passage with a surrounding skirt while pressing the peripheral edges of the sheets, so that the partial

vacuum is effectively communicated, through the passage between the male former and the surrounding skirt to the lower sheet(s) of the stack.

The examiner has made much of the description at lines 28-35 of Herrington that while the description refers to "the production of a single glass sheet, ... the principles of the invention are equally applicable in the production of other automobile glazing closures such as conventional laminated windshields, for example having multiple layered sheets of glass." According the final rejection, this means that the process of Herrington can "be used for multiple sheets at once."

However, nowhere does Herrington mention bending multiple sheets "at once." Instead, a careful reading of this portion of Herrington reveals that it only refers to the final product being manufactured as a laminated windshield having multiple layered sheets of glass. Such a laminated windshield may be made by bending individual sheets and thereafter assembling them into a laminate. Creating such a laminated product does *not* imply bending multiple superposed sheets "at once."

The examiner has correctly recognized that that Herrington does not teach the claimed feature that the male former is surrounded by a passage between the male former and a surrounding skirt. As noted above, this aids in communicating the partial vacuum to the lower sheet(s) of the stack.

Significantly, however, two other differences exist: (1) Herrington only bends a single glass sheet at a time; and (2) Herrington initiates the suction through the upper mold member before the sheet has made contact with the male member.

As to difference (1), as explained above, the sole basis for concluding that the process of Herrington also applies to plural superposed sheets is based on a misreading of Herrington.

As to difference (2), the examiner has not pointed to any explicit description of when the vacuum is commenced Herrington. Instead, the examiner has merely asserted (paragraph

5 of the final rejection) that "there is nothing [in Herrington] to suggest that the partial vacuum commences before the pressing step," i.e., the examiner has asserted the absence of any explicit teaching.

It is instead deemed by the examiner that the commencement of suction through the upper mold member before the sheet has made contact with the male member in Herrington would have been clear from the description of the vacuum being applied "to assist in the shaping of the glass sheet as the sheet is being pressed." However, this description in Herrington only implies that the vacuum continues during the pressing step; it has no implication whatsoever with respect to the time that the vacuum commences.

Instead, the further description in Herrington that the partial vacuum assists in the "handling" of the glass sheets implies that the commencement of suction through the upper mold member occurs before the sheet has made contact with the male member, since the "handling" occurs before the sheet has made contact with the male member.

Moreover, these differences, particularly in combination, address problems which would not arise in the single sheet bending process of Herrington. For example, the application of suction before the upper sheet of a stack of plural superposed sheets has made contact with the male member can cause the upper sheet to lift off of the lower sheet(s) or, at a minimum, can cause its position to shift slightly, whereby accurate bending cannot be achieved. Further, as mentioned above, once the suction is applied it may not be effectively transferred to the lower sheet(s), which can separate from the upper sheet once the female former is lowered. There would be no reason for one skilled in the art to modify the single sheet bending method of Herrington to address these problems. Instead, it is only the teachings of the present application that provide a motivation for one skilled in the art to apply the solutions of the invention to the problems of bending plural superposed sheets.

Additionally, the examiner has correctly recognized that that Herrington also does not teach that the male former is surrounded by a passage between the male former and a surrounding skirt. Kuster et al was therefore cited to teach such a skirt.

Kuster et al bends plural superposed glass sheets by pressing the sheets against an upper bending block 11. A vacuum is applied through the gap 41 between the upper bending block 11 and the skirt 17 to raise the sheets from the lower bending ring 3 (col. 4, lines 15-19), and the skirt 17 is provided to enhance the "lifting effect." See, col. 4, lines 23-34, especially lines 31-32.

However, while Kuster et al bends plural superposed glass sheets, the vacuum is applied through the gap 41 between the upper bending block 11 and the skirt 17 only to raise the sheets from the lower bending ring (note that the openings 37 in Fig. 2 are primarily provided to apply positive pressure for separating the glass sheets from the forming surface; col. 4, lines 57-58). Of course, since the edges of the sheets in Kuster et al are not pressed between the upper and lower molds, no seal therebetween will be formed, whereby the vacuum may not effectively be communicated to the lower sheet.

Kuster et al also teaches an alternative in which the upper bending block is lowered into contact with the bending ring 3. However, in this case, since it is not required to raise the glass sheets to the upper bending block 11, no vacuum is required.

In either case, since the function of the skirt 17 of Kuster et al is to enhance the lifting effect, unless the glass sheet of Herrington is to be raised from the lower press member 30 by the vacuum (in which case it would not be "continuously supported by the female former prior to the pressing step"), there would be no apparent reason for one skilled in the art to provide such a skirt therein.

Further, Kuster et al could not provide a teaching to overcome the other shortcoming of Herrington: bending a single glass sheet at a time while initiating the suction through the

upper mold member before the sheet has made contact with the male member. While Kuster et al applies a vacuum for bending plural superposed glass sheets, it does so while raising the sheets off of the lower bending ring.

Dependent Claims 15 and 24 further recite that positive gas pressure is applied *during* the step of applying the partial vacuum. This reduces the risk of the glass being marked by contact. On the other hand, there is apparently no dispute that the positive pressure in Herrington is applied *after* the vacuum is discontinued (col. 7, lines 33-36). The same is true for Kuster et al (col. 4, lines 57-60). It is respectfully submitted that the claims define over this prior art.

B. Herrington et al in view of Kuster et al and Morin

Claim 19 further recites that the bending is carried out at a temperature of less than 640°C. Claim 22 further recites an application of the method of claim 13 to production of a laminated glazing having locally a coefficient of non-developability greater than 2. Morin was additionally cited to teach these features. However, since Morin was not cited to overcome the aforementioned shortcomings of Herrington et al in view of Kuster et al with respect to the main claims, it is respectfully submitted that these dependent claims define over any of this prior art.

Appellants therefore request that the final rejection be REVERSED.

Respectfully submitted,

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APPENDIX OF APPEALED CLAIMS

Claim 13: A method of simultaneously bending two or more superposed glass sheets, comprising the sequential steps of:

allowing the glass sheets to sag under gravity;

placing a central region of the superposed glass sheets into contact with a male former in a bending cell, said male former being surrounded by a passage between the male former and a surrounding skirt, by advancing a female former supporting the superposed glass sheets toward the male former located above the female former, while continuously supporting the glass sheets with the female former;

pressing a peripheral region of the superposed glass sheets between the male former and the female former to clamp together the edges of the glass sheets to seal the space between the sheets, wherein the glass sheets are continuously supported by the female former prior to the pressing step and until at least after the commencement of the pressing step;

applying a partial vacuum to an uppermost one of the superposed glass sheets through the convex surface of the male former, which has means for applying a partial vacuum through the convex surface, while continuing the pressing step, wherein application of the partial vacuum commences after the upper glass sheet has made contact with the male former;

discontinuing the pressing step by separating the male former from the female former, the superposed glass sheets remaining in contact with the male former under an effect of a partial vacuum at least partly applied through the passage between the male former and the skirt surrounding the male former;

while the superposed glass sheets are in contact with the male former under the effect of the partial vacuum, bringing a cooling support under the glass sheets;

stopping the partial vacuum to allow the superposed glass sheets to rest on the cooling support; and

taking the superposed glass sheets away for cooling the glass outside the bending cell.

Claim 14: The method as claimed in claim 13, wherein the gravity-induced sag is mainly cylindrical and leads to a deflection approximately equal to a final deflection.

Claim 15: The method as claimed in claim 13, wherein during the step of applying the partial vacuum through the male former, positive gas pressure is also applied through the male former in a central region of the glass sheets, the male former being covered with a fibrous material.

Claim 16: The method as claimed in claim 13, wherein the sag is at least partly brought about in a tunnel oven through which the glass sheets are conveyed toward the bending cell, the glass being placed on a sag support.

Claim 17: The method as claimed in claim 13, wherein the sag is at least partly brought about on a sag support occupying an area inscribed entirely, seen from above, within the female former, and the female former moves the glass sheets by rising toward the male former and passing around the sag support.

Claim 18: The method as claimed in claim 17, wherein the sag support is a skeleton set back by at least 2 cm from a peripheral edge of the glass sheets.

Claim 19: The method as claimed in claim 13, wherein the bending is carried out at a temperature of less than 640°C.

Claim 20: A bending system for carrying out the method as defined in claim 13, comprising:

an oven including a system for transporting a skeleton-supported glass sheet, that moves the skeleton to a bending cell, the cell comprising a frame or annular female former, the skeleton occupying an area inscribed entirely, seen from above, within the annular female former, and a convex male former located above the annular female former;

means for discharging the skeleton from the bending cell; and

means for moving vertically the annular female former, and the male former being provided with means for applying a partial vacuum through its convex surface.

Claim 21: The system as claimed in claim 20, wherein the skirt surrounds the male convex former such that a partial vacuum can be applied around the outside of a glass sheet near a narrow edge of the glass sheet.

Claim 22: An application of the method of claim 13 to production of a laminated glazing having locally a coefficient of non-developability greater than 2.

Claim 23: A method of simultaneously bending two or more superposed glass sheets, comprising the sequential steps of:

allowing the glass sheets to sag under gravity;

placing a central region of the superposed glass sheets into contact with a male former in a bending cell, said male former being surrounded by a passage between the male former

and a surrounding skirt, by advancing a female former supporting the superposed glass sheets toward the male former located above the female former, while continuously supporting the glass sheets with the female former;

pressing a peripheral region of the superposed glass sheets between the male former and the female former to clamp together the edges of the glass sheets to seal the space between the sheets, wherein the glass sheets are continuously supported by the female former prior to the pressing step and until at least after the commencement of the pressing step;

applying a partial vacuum to an uppermost one of the superposed glass sheets through the convex surface of the male former, which is at least partly air permeable, while continuing the pressing step, wherein application of the partial vacuum commences after the upper glass sheet has made contact with the male former;

discontinuing the pressing step by separating the male former from the female former, the superposed glass sheets remaining in contact with the male former under an effect of a partial vacuum at least partly applied through the passage between the male former and the skirt surrounding the male former;

while the superposed glass sheets are in contact with the male former under the effect of the partial vacuum, bringing a cooling support under the glass sheets;

stopping the partial vacuum to allow the superposed glass sheets to rest on the cooling support; and

taking the superposed glass sheets away for cooling the glass outside the bending cell.

Claim 24: The method as claimed in claim 23, wherein during the step of applying the partial vacuum through the male former, positive gas pressure is also applied through the male former in a central region of the glass sheets, the male former being covered with a fibrous material.

Claim 25: The method as claimed in claim 23, wherein the sag is at least partly brought about on a sag support occupying an area inscribed entirely, seen from above, within the female former, and the female former moves the glass sheets by rising toward the male former and passing around the sag support.

Claim 26: The method as claimed in claim 25, wherein the sag support is a skeleton set back by at least 2 cm from a peripheral edge of the glass sheets.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.